

SIXPENCE

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# AMATEUR RADIO

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## BAIRD COLOUR TELEVISION.

(From "Wireless World")

At his laboratories in Sydenham, Mr. Baird has lately demonstrated his latest contribution to the television art. He used a large screen receiver of a type suitable for the home, capable of providing a super high-definition picture in full natural colours as well as reproducing the pre-war standard television transmission as radiated by the B.B.C.

Mr. Baird's first demonstration of television in colour was in 1928. This was followed, after ten years of successes and setbacks, by an 8 foot by 12 foot colour television picture being shown in a London theatre to an audience of 3,000 people. The transmission was by means of wireless over a distance of 8 miles. Both of the above mentioned results were achieved with the use of all - mechanical methods of scanning at both the transmitting and receiving ends of the links employed. In 1939 a demonstration was given of a 120 line colour picture using the same type of scanner at the transmitter as had previously been employed, but making use at the receiving end of a cathode ray tube in conjunction with a rotating colour filter disc. This was the fore-runner of the present receiver.

Before describing the transmitter and receiver, which were used in the demonstration, a short account will be given, for the benefit of readers not familiar with the three colour process, of the principle governing the reproduction of natural colour prints. All colours are produced by mixing the three primary colours red, green and blue in the correct proportions. Blue and red mixed, results in purple; red plus green gives us yellow, and so forth throughout the whole range of colours. In colour printing this principle is used in the following manner:- three pictures are made of the coloured subject, one showing the red component of the subject, one the green component, and the other the blue. Upon these three prints being superimposed a print is obtained which has in its composition the complete colour range of the subject, so providing a reproduction in natural colours.

Mr. Baird makes use of this principle by providing colour filters to his transmitter and receiver scanners, but uses only

two colours, red and blue-green, since he has discovered that this combination gives, with the type of photo-electric cell used, the same results as would be obtained with the three separate filters. This results in a considerable simplification of the scanning mechanism.

Mr. Baird's original system of flying-spot scanning is used. That is to say, the subject is scanned by a moving spot of light which, in the case of colour television, is projected through a disc fitted with the blue-green and red colour filters, so that the scene or person being televised is scanned by blue-green and red spots in rapid succession. The standard of scanning with this system is 600 lines per picture.

In the flying-spot system of scanning, the moving light spot is not obtained by mechanical means, but from the exceedingly bright spot that may be obtained in the screen of a projection cathode-ray tube. The tube used is of the "tea-pot" type, so named by reason of its shape, operating at a voltage in the region of thirty thousand. The spot is moved in the required scanning motion over the screen by magnetic deflector coils operated from circuits normally associated with such high voltage tubes. Mounted in front of the tube and driven by a motor is the disc on which are mounted the colour filters mentioned before. In front of the disc is a lens system which serves to transmit the scanning spot, after it has passed through the filter, to the subject or scene being televised, which is therefore scanned first by a blue-green and then by a red spot, the filter disc being run at the correct speed to allow full coverage for each filter colour. The light from the coloured spots covering the scene is reflected on to three large colour sensitive photo-electric cells, the current from these being amplified and passed to radio or line circuits for transmission to the receiver.

The method of reproducing the picture in colour follows the principles of colour printing already explained. The transmitted pictures corresponding to the colours described are superimposed to form the complete television picture in natural colours. The manner in which this is carried out is the converse of the scanning system at the transmitter, the picture being first produced in black and white on the screen of the cathode-ray tube, in front of which is rotated a filter disc identical with that at the transmitter. By means of impulses transmitted with the picture signal, the disc is kept absolutely in step with its counterpart at the transmitter.

The black and white pictures passing through the filters are coloured blue-green and red and then projected on the screen by means of an efficient optical system, at such speed that the eye sees them there together. The result of this is the same as that achieved in colour printing, namely, they blend to form a picture in natural colours. The projection cathode-ray tube in the receiver is situated at the bottom, throwing the picture

## STABILISATION OF NEGATIVE FEEDBACK AMPLIFIERS.

(From "Wireless World")

The merits of amplifiers which make use of negative feedback are now widely known, and the improvement in the matter of harmonic distortion is probably the one that is first thought of by all those who are interested in the problems of amplification -- undoubtedly because negative feedback is now so much used in ordinary AF amplifiers, and the most immediate problem there is that of the curved valve characteristics. Negative feedback however, has other uses, and one is that of levelling-up the response of an amplifier over a considerable range of frequencies. In the absence of negative feedback stray capacities in the amplifier often make it difficult to realise the wide and level characteristics needed -- at least in any simple manner.

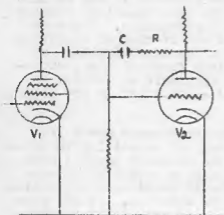
It must not be thought that feedback methods never give rise to problems of their own; they do, and especially in wide-band types of circuits. To achieve the greatest benefit from negative feedback it is necessary to use an amplifier of very large amplification. In this way the flattest characteristics and the least non-linear distortion are obtained. At the same time many amplifier stages are needed, and this is of significance when the presence of stray and coupling reactances is remembered.

### CAUSES OF SELF OSCILLATION.

Suppose we consider a single amplifying stage in which the anode circuit contains simply a resistance. In calculating the gain of the stage quite generally we cannot think of the anode load impedance as just this resistance; we must think of it as this resistance shunted by whatever stray capacities there may exist. At sufficiently high frequencies the reactance of the shunt capacity will be of less magnitude than the resistance of the nominal load element. This, of course, means that the amplification of the stage will be less, but, more important, it means also that signals will be retarded in phase as compared with their transit through the amplifier at lower frequencies. The maximum retardation at the highest frequencies is 90 degrees. Thus, if three stages operate in cascade it is clear that at some sufficiently high frequency the effect of "negative" feedback will be the return to the input side of the amplifier of an in-phase signal of appreciable amplitude. If this signal is too large the amplifier will not, in fact, be an amplifier, but a self excited oscillator.

To prevent multi-stage negative feedback amplifiers from becoming unstable it is thus essential that the amplification

should have fallen sufficiently before the phase rotation in the amplifier has increased to 180 degrees. Methods to this end that have been used include the insertion of coupling networks in the amplifier or in the feedback path itself, and even an auxiliary path connected in shunt to the main feedback path which comes into operation at the higher frequencies to reduce the amplitude of signals fed back. Another method lies in the use of a special form of feedback applied to operate on one or more stages separately in the amplifier.



An example of the latter method is shown in the diagram. The stage  $V_2$  having the special feedback applied to it is driven from an earlier stage  $V_1$ , which appears to the driven stage as a constant current source and may simply consist of a pentode type of amplifier. The feedback is of the current variety, and is brought about by the connection of an impedance  $R$ , complex or otherwise, between the output circuits of the two stages; it has the effect of reducing the gain of the driving stage  $V_1$  as currents are fed back in phase oppos-

ition into the output circuit of this stage, but the gain of the driven stage  $V_2$  remains almost unaltered. The feedback impedance in a simple case may be constituted by a fairly high resistance  $R$ , namely, one fairly large compared with an anode load resistance, and by a condenser  $C$  connected in series with it. The condenser  $C$  is of small value so as to prevent the feed-back functioning appreciably in the normal operating range of the amplifier, but at the higher frequencies its reactance becomes small and feed-back occurs through the feedback resistance. Thus although the phase rotation through the whole amplifier still occurs as before, yet the reduction of the gain by means of the auxiliary current feedback reduces the amplitude of the signal components which are subject to the rotation sufficiently to prevent any danger of self oscillation.

Advantage may be taken of the increased stability of the amplifier to obtain a higher amplification or with increased over-all feedback a more level characteristic. In order to increase the rapidity with which the auxiliary feedback is brought into action at the higher frequencies an inductance may be connected across the series resistance in the feedback impedance.

DIVISIONAL NOTES.

New South Wales Division

By VK2TI

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The May General Meeting was held at the Y.M.C.A. Buildings on Thursday 15th before a representative attendance. The increasing attendances each month are doubtless due to Councils efforts to provide a working demonstration each meeting.

Although the retiring Council was re-elected unopposed at the General meeting held in February of this year the election of office bearers was postponed due to the illness of Harold Peterson ZHP. Harold, members will regret to learn, suffered a nasty accident some months ago that compelled him to lay up for a considerable time. Councillors were pleased to welcome Harold back to the fold at the May Council Meeting. ZHP in reply, thanked Council for their action in deferring the election of Office Bearers until such time as he was able to be present, but intimated that he did not desire nomination as President of the Institute. Councillors expressed regret at this decision and many tributes were paid to Harold's work as President of the Division over a long period during which time it rose from a very lowly position to that which it holds today--the most active and strongest of all the states.

Office Bearers elected were as follows:-

President	...	F. Goyen	VK2UX
Vice Presidents	...	H. Peterson C. Horne	VK2HP and VK2AIK
Secretary	...	W. G. Ryan	VK2TI
Treasurer	...	W. J. McElrea	VK2UV
Technical Officer	...	J. Howes	VK2ABS
Assist Secretary	...	D. Dunn	VK2EG
Magazine	...	A. Joscelyne	VK2AJ0

In declaring the General Meeting open the Chairman extended a welcome to Bill Mather VK3WD, and congratulated Messrs. Arthur Walz 4AW and Launse Deane 5LD upon their promotion to Pilot Officer.

The lecture and demonstration was then given by Messrs. Johnson and McIntosh. These two hams had long been experimenting with home recording apparatus and had kindly consented to bring their gear along to the Institute. After describing the apparatus a record was made and members present were asked to volunteer to come forward and have their voices recorded. Much

surprise and amusement was caused when the record was played back and we were able to hear just how our voices sounded. Possibly the high light of this demonstration was the fact that after a lot of persuasion, Jim Corbin VK2YC eventually spoke into a microphone! What a great pity Ray Jones VK3BJ was not present at this meeting. What a scoop it would be to have 2 YC and 3RJ before the mike at the one and same time. Just think what posterity would have gained by having them on the same record!

Upon the conclusion of the demonstration the Chairman informed the meeting of the Election of Office Bearers, and it was decided that a recording be made of the various tributes paid to 2HP as Chairman, and this recording be presented to him. Messrs. Goyen, Ryan, Knock, and Lusby, as members longest associated with 2HP, spoke in glowing terms of Harold's work and interest in the Institute and Amateur Radio generally, and hoped it would not be long before he fully recovered.

The June General Meeting of the Division will be held at Y.M.C.A. Buildings on Thursday, 19th June, and the Lecturer will be Mr. W. J. McElroa.

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#### VICTORIAN DIVISION.

There was a large attendance at the monthly meeting of the Victorian Division held on Tuesday June 3rd. There were many visitors present, and we were pleased to welcome back our old friend Gil Miles, ex 3KQ last known as 7KQ. Another visitor was Mr. W. Holland, VK9WU from New Guinea.

The main subject of the evening was a working demonstration of audio equipment, with an output meter and standard frequency recordings. The amplifier was supplied by Mr. J. Kling, 3JB, who built it up specially for the occasion. This amplifier consisted of a 6N7G as input tube and phase inverter, and a pair of 6V6G's with inverse feedback over both stages. There had been no tests made with the amplifier prior to those made at the meeting. Mr. Ralph Clarkson supplied the crystal pick-up and gramophone.

Unfortunately it was not possible to completely match the output channel from the amplifier to the output meter, however the tests were very interesting, the result of which showed that the amplifier had a big hump at the extreme low frequency end, and falling off very badly at 6000 cycles.

The highlight of the evening was the playing of some recordings made by Mr. Ivor Morgan VK3BH. These recordings were mainly of many of the gang made when we were "on the air." It was like the smell of rain to those who haven't seen the

# D I V I S I O N A L   N O T E S

- New South Wales Division -

By VK2AJ0

The June meeting of the N.S.W. Division was held on the 19th at the Y.M.C.A. Buildings, Pitt Street. Two vacancies on the Council were filled by the election of Messrs. Ray Priddle VK2RA and Russ Miller. Russ has been President of the Zero Beat Radio Club for many years. The President of the Division, Frank Goyen, was congratulated - by proxy - on having been granted a commission in the Air Force, but unfortunately this has necessitated him resigning from the Council. Ray Priddle was unanimously elected to the position and the Council is now constituted:-

President	.. R. Priddle	VK2RA
Vice-Presidents	.. H. Peterson	VK2HP
	.. C. Horne	VK2AIK
Secretary	.. W. Ryan	VK2TI
Treasurer	.. W. McIlrea	VK2UV
Technical Officer	.. J. Howes	VK2ABS
Magazine	.. A. Joselyne	VK2AJ0
Councillors	.. R. Miller	
	.. D. Dunn	VK2EG

The General Meeting was well attended, and had pleasure in making a further donation to the funds of "Air Force House." The lecture was delivered by Bill McIlrea, and was entitled "What happens when the shutter clicks," and judging by the range of questions fired at the lecturer ham radio contains many silent and not so silent supporters of the art of photography. 2 UV was ably assisted by our old friend Joe Reed 2JR. Incidentally the cameras exhibited by both these members showed the extremes in Camera design. 2UV's exhibit was a Graflex and 2JR's one of those minatures that do everything but develop and print the negative. At a later date it is anticipated that the Council will be able to prevail upon Joe to give a Lecture on the Calypsonian Venus...Ahem!

Congratulations to Bill Moore and Morry Meyers upon obtaining their Commissions in the R.A.A.F. After a long time the efforts of these chaps in organising the R.A.A.F.W.R. in New South Wales has been rewarded.

The Annual Election of the Institute Members of the New South Wales Section of the Vigilance Committee has now been completed and Messrs. Priddle, Peterson, and Ryan were chosen by the Senior Radio Inspector.

The July General Meeting of the Division will be held

at the Y.M.C.A. Buildings, Pitt Street, Sydney on Thursday 17th commencing at 8 p.m. and the subject set down for Lecture is entitled "LIGHT". A cordial invitation is extended to all Hams on service at present.

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-- WAVERLEY RADIO CLUB --

Twenty-second Annual re-union

The twenty-second Annual Re-Union of the Waverley Amateur Radio Club was held in the Club Rooms, 13 MacPherson Street, Waverley on Tuesday 3rd of June. The manner in which this Club has carried on since its inception in 1919 was favourably commented upon by all present.

The Toast of the Club was proposed by Mr. John Moyle VK2JU Editor of Radio and Hobbies, who in his remarks traced the history of the Club and its achievements from the early days right up to the present.

The Institute was represented by Messrs. Peterson and Ryan who congratulated the Club on its fine record and also its unswerving loyalty to the Institute. Other Toasts honored were those of the "W.I.A." "Hams on Service," "Foundation Members". Upon conclusion of the speeches a moving picture show was put on by two of the members. During "Interval" ham spirit was much in evidence and many tales were told -- both probable and highly improbable.

Although the number present this year was naturally smaller than on previous occasions those present unanimously voted it a great night and are looking forward to the time - let us hope in the near future - when all Hams will be able to tell of the DX they worked "Last Night" ..

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VICTORIAN DIVISION

- Attention -

The Annual General Meeting of the Victorian Division will be held at the Institute Rooms, Queen Street, on Tuesday Night, August 5th, when it is hoped that there will be a very large attendance. Besides the ordinary business of the Annual Meeting, a lecture is scheduled to be delivered by Mr. W. Holland VK9VW, which should be very, very interesting indeed.

Those who did not come along to the last meeting missed a real treat. Listed for the evening was a lecture by our old friend Gil Miles 7KQ, ex 3KQ, fortunately or unfortunately for Gil (he didn't say very much) someone got in before him and provided an evening which us "HAMS" haven't had for many a long

day. Methinks that quite a few of the gang present went home and looked very longingly at their--or whats left--of their transmitters. Lieutenant Chippendale VK3VU, and some of his men--VK3VD, VK9MW, and Rimmer of the Army Headquarters Experimental Radio Laboratories brought along a display of Army Radio Equipment, which included some RF gear, pack sets, to wit, and a Kingsley receiver, modelled on well known American makes, the performance of which was excellent. Probably the exhibit which annoyed the gang more than anything else was a number of high power 'bottles' which were--believe me or believe me not, were handled with loving care. One could almost read the thoughts - "When I get back on the air:...."

During the month a letter was received from Tim Wells VK3TW of Hamilton--to quote from his letter ---

"Incidentally, hams are fairly well represented in this one horse town at the present time, there is Bill Hohir (can't think of his call) but he is pilot on Ansett Airways Airspeed Envoy, Hamilton to Melbourne. Martin Chaffer VK3XF, he is engineer on the staff of commercial 3HA, and bye the bye, Mart is to join the ranks of the benedicts on Saturday next 7th inst., the wedding is taking place in Melbourne. Stan Zounart VK3SZ is still in charge of radio repairs at the Hamilton Branch of A. G. Healing. Mort Riley VK3TN is still doing a good job of work persuading prospects that the make of radio set that he sells is the best in the world. Jim Michell VK3JP is still Lands Officer for this truly rural area, and of course there is Tim VK3TW, the old man himself, so it seems that when we go back on the air again there will be a spot of QRM around this joint as all these fellows live within a radius of half a mile .... Brian Falkenburg VK3FA (aint it a shame) successfully passed the medical test for the RAAF last week. Brian is in the local Light Horse camp as a Universal Trainee and his statement that he never could get along with horses is born out by the fact that for the past week he has been enjoying his meals off the mantlepiece -- poor Brian.

You may be interested to know that I have submitted a plan to the local Federal Member whereby a chain of emergency Stations could be set up at the main towns, utilising the Hams gear and brains to keep them operating. The details are too many to quote here but the MHR in question was impressed and is placing them before the responsible authorities. (Here's hoping).

In conclusion allow me to add my humble congratulations to you fellows in the City for your magnificent efforts in keeping the good old Mag. going under such trying circumstances. Be sure to send my copy along, and if any of the foregoing is of interest for publication purposes, then go right ahead and print it.

My kind regards to all the boys,

Yours,

George L. D. Wells.

VK3TW (Tim)

There are quite a number of the boys at the Barracks mainly occupied as operators in Air Force capacity. Among them is VK3YF, VK3KY, VK3KR, VK3OR.

- 3WE .. surprised quite a number of the boys by appearing at the last meeting -- Sgt. A. N. Williams -- to you -- at present at Broadmeadows.
- 3JO .. thinking of the old 5 mx field days was not content until he took a pack set up on to the roof, with 3 RN to t'other end made a few tests. Someone asked which way the aerial was pointing???????. CENSOR ED.
- 3RN .. there's a bit of blackmail attached to this---Ron---as far as I can gather spends a considerable amount of time walking the floor--knows all the lullabys around the place.
- 3XH .. now Captain Johnson is to be located at Army Headquarters Ringwood.
- 3XE .. is with the R.A.A.F. abroad.
- 3HG .. put in an appearance at the meeting.
- 3BQ .. had rather a bad time at the meeting .. Max turned up while the last magazine was being printed...somehow I've an idea Max has ideas for speeding up the printing.
- 3DG .. is reported to be a member of the R.A.A.F. and is at present at Laverton.
- 3HQ .. is, I believe nursing at the Alfred Hospital. How's about making one of the meetings Marg. First Tuesday of any month.
- 3IK .. reports that he is indulging in Wine, Women and Song as a hobby. The neighbours don't complain about the amplifier any more, 'cause it aint no use, methinks he'll have the Malvern Council on his trail again when he starts foolin' with the Saxophone in front of the D104.
- 3HX .. usually forgets himself in these notes--yes in more ways than one--some people want to know why he is late on a Saturday when the Mag. is being printed--someone else wants to know how he writes these notes when his thoughts should be elsewhere. Wonders too.????

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The Division meets on the Third Thursday of each month at Y.M.C.A. Buildings, Pitt Street, Sydney, and an invitation is accorded to all Amateurs to be present.

**H A M S !**

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